

2211 W. Meadowview Rd., #101 Greensboro, NC 27409

tel: 336/323-0092 fax: 336/323-0093 www.JoyceEngineering.com

November 8, 2012

Brian Wootton, Hydrogeologist Solid Waste Section Division of Waste Management 1646 Mail Service Center Raleigh, NC 27699-1646



RE: Installation of Landfill Gas Monitoring Probes Germantown Landfill Permit No. #97-01 Wilkes County, North Carolina JOYCE Project No. 00356.1201.11 Task 01

Dear Mr. Lane:

On behalf of Wilkes County, Joyce Engineering Inc. (JOYCE), is submitting the enclosed boring logs and driller's records for three landfill gas monitoring probes, installed on October 9, 2012 at the Germantown Landfill. The three probes (GP-1, GP-2 and GP-4) were installed along the northern border of the landfill property and were advanced to depths of 24 feet, 7 feet and 34 feet, respectively. Screen depth ranged from four feet below grade to the bottom of the boring in probes GP-1 and GP-4. In probe GP-2, the screen extended from 2 to 7 feet. Proposed probe GP-3 was not installed because groundwater was encountered at a depth of approximately five feet, prohibiting the installation of an effective gas monitoring probe. Probes were constructed of 1-inch PVC. Boring logs and probe completion diagrams, driller well construction records, and a site map showing probe locations are attached.

Please feel free to contact me at (336) 323-0092 if you have any questions regarding this submittal.

Sincerely,

JOYCE ENGINEERING

Larry Hineline

Technical Consultant

Attachments: Boring Logs

Drillers Well Construction Logs Germantown Landfill Site Map

Kent Brandon, Wilkes County



$\underline{NonResidential}$ well construction record

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2581

1. WELL CONTRACTOR:	d. TOP OF CASING IS 2.5 FT. Above Land Surface*
BRIAN THOMAS	*Top of casing terminated at/or below land surface may require
Well Contractor (Individual) Name	a variance in accordance with 15A NCAC 2C .0118.
GEOLOGIC EXPLORATION, INC	: e. YIELD (gpm): N/A METHOD OF TEST N/A
Well Contractor Company Name	f. DISINFECTION: Type N/A Amount N/A
176 COMMERCE BLVD	
Street Address STATESVILLE NC 28625	g. WATER ZONES (depth): Top Bottom Top Bottom
City or Town State Zip Code	TopBottomTopBottom
(704) 872-7686	TopBottomTopBottom
Area code Phone number	:
2. WELL INFORMATION:	: Thickness/ : 7. CASING: Depth Diameter Weight Material
WELL CONSTRUCTION PERMIT#	Top 0.0 Bottom 4.0 Ft. 1 INCH SCH 40 PVC
OTHER ASSOCIATED PERMIT#(if applicable)	: Top Bottom Ft
SITE WELL ID #(if applicable) GP-1	Top Bottom Ft
3. WELL USE (Check One Box) Monitoring Municipal/Public	: : 8. GROUT: Depth Material Method
, , , = 1 =	Top 0.0 Bottom 2.0 Ft. PORTLAND BENTONITE SLURRY
Industrial/Commercial Agricultural Recovery Injection	•
Irrigation ☐ Other ☑ (list use) ☐ GAS PROBE	•
DATE DRILLED 10/08/12	TopBottomFt
4. WELL LOCATION:	9. SCREEN: Depth Diameter Slot Size Material
580 POPLAR GROVE ROAD 28697	Top 4.0 Bottom 22.0 Ft. 1.0 in010 in. PVC
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)	: Top Bottom Ft in in
CITY: WILKESBORO COUNTY WILKES	TopBottomFtininin.
TOPOGRAPHIC / LAND SETTING: (check appropriate box)	
□Slope □Valley ☑Flat □Ridge □Other	10. SAND/GRAVEL PACK:
LATITUDE 36 • 7 • 8.1300 " DMS OR DD	: Depth Size Material : Top 3.0 Bottom 22.0 Ft. 20-40 FINE SILICA SAND
LONGITUDE 81 • 11 • 56.8800 " DMS OR DD	•
Latitude/longitude source: GPS Topographic map	TopBottomFt
(location of well must be shown on a USGS topo map andattached to	TopBottomFt
this form if not using GPS) 5. FACILITY (Name of the business where the well is located.)	11. DRILLING LOG
s. FACILITY (Name of the business where the well is located.)	Top Bottom Formation Description
GERMANTOWN LANDFILL N/A	0.0 / 8.0 BROWN SILTY CLAY
Facility Name Facility ID# (if applicable)	8.0 / 22.0 TAN SILTY CLAY
580 POPLAR GROVE ROAD	
Street Address	
WILKESBORO NC 28697	
City or Town State Zip Code	<u> </u>
WILKES COUNTY SOLID WASTE SERVICES	
Contact Name	***************************************
PO BOX 389 Mailing Address	
•	
ROARING RIVER NC 28669 City or Town State Zip Code	
English English	12. REMARKS:
)	BENTONITE SEAL FROM 2.0 TO 3.0 FEET
rea code Phone number	POLIFORDY OF DETECTION THE THE WAY AND SOLUTED BY A COORD WAS AUTHOR
. WELL DETAILS:	I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH TO THE CONTROL ON STANDARDS, AND THAT A COPY OF THIS BEORD HAS BEEN PROVIDED TO THE WELL OWNER.
a. TOTAL DEPTH: 22.0 FEET	
b. DOES WELL REPLACE EXISTING WELL? YES NO IN	SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE
c. WATER LEVEL Below Top of Casing: DRY FT.	
(Use "+" if Above Top of Casing)	: BRIAN THOMAS : PRINTED NAME OF PERSON CONSTRUCTING THE WELL
•	

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b Rev. 2/09



North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2581

1. WELL CONTRACTOR: BRIAN THOMAS	d. TOP OF CASING IS 2.5 FT. Above Land Surface* *Top of casing terminated at/or below land surface may require
Well Contractor (Individual) Name	a variance in accordance with 15A NCAC 2C .0118.
GEOLOGIC EXPLORATION, INC	: : e. YIELD (gpm): N/A METHOD OF TEST N/A
Well Contractor Company Name	f. DISINFECTION: Type N/A Amount N/A
176 COMMERCE BLVD	:
Street Address	g. WATER ZONES (depth):
STATESVILLE NC 28625 City or Town State Zip Code	TopBottomTopBottom
·	TopBottomTopBottom
(704) 872-7686	TopBottomTopBottom
Area code Phone number	Thickness/
2. WELL INFORMATION:	7. CASING: Depth Diameter Weight Material
WELL CONSTRUCTION PERMIT#	Top 0.0 Bottom 2.0 Ft. 1 INCH SCH 40 PVC
OTHER ASSOCIATED PERMIT#(if applicable)	TopBottomFt
SITE WELL ID #(if applicable) GP-2	TopBottomFt
	And the state of t
3. WELL USE (Check One Box) Monitoring ☐ Municipal/Public ☐	8. GROUT: Depth Material Method
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐	Top 0.0 Bottom 1.0 Ft. PORTLAND BENTONITE SLURRY
Irrigation Other (list use) GAS PROBE	Top Bottom Ft
DATE DRILLED 10/08/12	TopBottomFt
4. WELL LOCATION:	: : 9. SCREEN: Depth Diameter Slot Size Material
	Top 2.0 Bottom 7.0 Ft. 1.0 in010 inPVC
580 POPLAR GROVE ROAD 28697 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)	• • •
	TopBottomFtininin.
CITY: WILKESBORO COUNTY WILKES	Top Bottom Ftin in
TOPOGRAPHIC / LAND SETTING: (check appropriate box)	: - 10. SAND/GRAVEL PACK:
□Slope □Valley ☑Flat □Ridge □Other	Depth Size Material
LATITUDE 36 ° 7 ' 8.1300 " DMS OR DD	Top 1.5 Bottom 7.0 Ft. 20-40 FINE SILICA SAND
LONGITUDE 81 <u>11 56.8800</u> DMS ORDD	: Top Bottom Ft
Latitude/longitude source: ### Comparison of Section 2	TopBottomFt
this form if not using GPS)	11. DRILLING LOG
5. FACILITY (Name of the business where the well is located.)	Top Bottom Formation Description
OF DAMANTONAIN LANIDER I	0.0 / 7.0 TAN SILTY CLAY
GERMANTOWN LANDFILL N/A Facility Name Facility ID# (if applicable)	
580 POPLAR GROVE ROAD	
Street Address	
WILKESBORO NC 28697	
City or Town State Zip Code	:
WILKES COUNTY SOLID WASTE SERVICES	
Contact Name	
PO BOX 389	
Mailing Address	
ROARING RIVER NC 28669	
City or Town State Zip Code	12. REMARKS:
()	BENTONITE SEAL FROM 1.0 TO 1.5 FEET
Area code Phone number	· · · · · · · · · · · · · · · · · · ·
6. WELL DETAILS:	+ 150 HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 150 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS
a. TOTAL DEPTH: 7.0 FEET	155 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.
b. DOES WELL REPLACE EXISTING WELL? YES NO [SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE
c. WATER LEVEL Below Top of Casing:DRYFT.	: BRIAN THOMAS
(Use "+" if Above Top of Casing)	PRINTED NAME OF PERSON CONSTRUCTING THE WELL
/	LUMBED WANTE OF FEITOOR COROLING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b Rev. 2/09



North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2581

1. WELL CONTRACTOR: BRIAN THOMAS				F CASING IS			
Well Contractor (Individual) Name				variance in acco			
GEOLOGIC EXPLORATION, INC			e. YIELD	(gpm): N/A	METHOD	OF TEST	N/A
Well Contractor Company Name		•	•	ECTION: Type			
176 COMMERCE BLVD						_ /	
Street Address STATESVILLE	NC	28625		R ZONES (depth)		Dat	lam
City or Town	State	Zip Code		Bottom			
•	Olaic	Zip Odde		Bottom			
(704) 872-7686			: Top	Bottom	Top	Bot	tom
Area code Phone number 2. WELL INFORMATION:			7. CASIN	G; Depth	Diameter	Thickness Weight	
WELL CONSTRUCTION PERMIT#			Top 0.0	Bottom4.0	Ft. 1 INCH	SCH 40	PVC
			Тор	Bottom	Ft.		
OTHER ASSOCIATED PERMIT#(if applicable)			•	Bottom			
SITE WELL ID #(if applicable) GP-4			: ''				
3. WELL USE (Check One Box) Monitoring M	•		•	T: Depth			Method
Industrial/Commercial Agricultural Reco		ection 🗆		Bottom 2.0			SLURRY
Irrigation Other (Ist use) GAS PROE	E			Bottom			
DATE DRILLED 10/08/12				Bottom	Ft		
4. WELL LOCATION:			9. SCREE	:N: Depth	Diameter	Slot Size	Material
580 POPLAR GROVE ROAD 28697			Top 4.0	Bottom 34.0	Ft. 1.0 in.	.010 in.	PVC
(Street Name, Numbers, Community, Subdivision, Lot N	o., Parcel, Z	ip Code)	Top	Bottom	Ft. in.	in.	
CITY: WILKESBORO COUN				Bottom			
TOPOGRAPHIC / LAND SETTING: (check app			:	OBAUTI BAOK			
□Slope □Valley ☑ Flat □Ridge □Other_			: 10. SAND	GRAVEL PACK: Depth	Size	Materi	al
LATITUDE <u>36 °7 '8.1300</u> " DMS O	R	DD	: Top 3.0	Bottom_34.0			
LONGITUDE 81 • 11 · 56.8800 " DMS O			: Top		Ft		
Latitude/longitude source: GPS Topogra	ohic map		•	Bottom			
this form if not using GPS)	inap anue	allached lo	: 11. DRILLI	NC LOC			
5. FACILITY (Name of the business where the we	l is located	l.)	: 11. DRILLI	Bottom	Form	ation Descrip	tion
·		,	:			· ·	
GERMANTOWN LANDFILL	N/A		0.0		RED SILT		
	ility ID# (if	applicable)		/ 19.0 / 34.0	TAN SILT	SILTY CLAY	
580 POPLAR GROVE ROAD Street Address				// /	TAN SILT	I CLAT	
Will KERDODO	NC	28697	:	<u>'</u>			
WILKESBORO City or Town	State	Zip Code	:	<u>'</u>			
	ee.		:	: /			
WILKES COUNTY SOLID WASTE SERVIC Contact Name	,ES		:	1			
PO BOX 389				/			
Mailing Address			:	1			
ROARING RIVER	NC	28669	:	<i>i</i>			
City or Town	State	Zip Code	12 DEMAI	ove.			
,			: 12. REMAI	ITE SEAL FROM.	2 0 TO 3 0 FEE	=T	
() Area code Phone number			DENTOIL		<u> </u>		
6. WELL DETAILS:			I DO HEREBY	CERTIFY THAT THIS	WELL WAS CONST	TRUCTED IN ACC	CORDANCE WITH
a. TOTAL DEPTH: 34.0 FEET			RECORD HAS	WELL CONSTRUCTION BEEN PROVIDED TO	ON STANDARDS, A	AND THAT A COP R.	PY OF THIS
			()	lian (1hor		10/26/12
b. DOES WELL REPLACE EXISTING WELL?		NO 🗗	SIGNATUR	RE OF CERTIFIED	WELL CONTI	RACTOR	DATE
c. WATER LEVEL Below Top of Casing:[(Use "+" if Above Top of Casing)	DRY	FT.		THOMAS NAME OF PERSO	ON CONSTRUC	TING THE V	VELL
			•				

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b Rev. 2/09



LOG OF BORING GP-1

(Page 1 of 1)

Germantown Landfill

Date Started : 10/8/2012

: Geologic Exploration Drilling Company

JOY	V	erman Vilkes ect No	cou	nty,		Date Started Date Completed Hole Diameter Drilling Method Sampling Method	: 10/8/2012 : 10/8/2012 : 4.25 inch : Hollow Stem Augers	No We Su	orthing Coord. esting Coord. rvey By	Dan Girdner
Depth in Feet	Surf. Elev.	Blow Count	% Rec.	nscs	DESC	CRIPTION	Well: GP-1 TOC Elev.:	- Acceptance		onstruction ormation
10— 15— 20— 25—				ML	Brown to gray SI		Grout Riser Pipe Bentonite Seal		WELL CONSTRUCT Date Compl. Hole Diameter(s) Drilling Method(s) Company Rep. WELL CASING Material Diameter Joints Approx. Csg. Sticku WELL SCREEN Material Diameter Joints Opening GRAVEL PACK Type WELL SCREEN SE. Type ANNULUS SEAL Type PROTECTIVE CSG Type WELL PAD Type	: 10/8/12 : 4.25-inch : HS Auger : Brian Thomas : Schedule 40 PVC : 1-inch : Threaded, flush p : 2.5-feet : Schedule 40 PVC : 1-inch : Threaded, flush p : 2.5-feet : Schedule 40 PVC : 1-inch : Threaded, flush : 0.010 inch : # 2 Sand AL : 3/8" Bentonite Pellets : Grout





LOG OF BORING GP-2

(Page 1 of 1)

Germantown Landfill Wilkes county, NC

Date Started : 10/8/2012
Date Completed : 10/8/2012
Hole Diameter : 4.25 inch

Drilling Company : Geologic Exploration
Northing Coord. :

Westing Coord. Survey By

JOYCE Pr	oiect No.356.1201.11 Task 01	Hole Diameter Drilling Method		Survey By	:
		Sampling Method	;	Logged By	: Dan Girdner
Depth Surf. Feet 0	Oject No.356.1201.11 Task 01 Tan SILT Bottom of Boring	Sampling Method	Well: GP-2 TOC Elev.: Grout Riser Pipe Bentonite Seal Sand Packing Screen	Logged By Well (Construction formation CTION : 10/8/12 : 4.25-inch : HS Auger : Brian Thomas : Schedule 40 PVC : 1-inch : Threaded, flush up : 2.5-feet : Schedule 40 PVC : 1-inch : Threaded, flush : 0.010 inch : # 2 Sand EAL : 3/8" Bentonite Pellets
25 30 35 35					





LOG OF BORING GP-4

(Page 1 of 1)

Germantown Landfill Wilkes county, NC

Date Started : 10/8/2012 Date Completed : 10/8/2012 Hole Diameter : 4.25 inch

: Geologic Exploration Drilling Company Northing Coord. Westing Coord.

JOY	CE Proje	ect No	.356	3.120	01.11 Task 01	Hole Diameter Drilling Method Sampling Method	: 4.25 inch : Hollow Stem Augers :	Survey By Logged By	: : Dan Girdner
Depth in Feet	Surf. Elev.	Blow Count	% Rec.	nscs		RIPTION	Well: GP-4 TOC Elev.:	I	I Construction nformation
10				ML	Brown SILT	raded, Brown SILT	- Sand Packing - Screen	WELL CONSTR Date Compl. Hole Diameter(s Drilling Method(s Company Rep. WELL CASING Material Diameter Joints Approx. Csg. Sti WELL SCREEN Material Diameter Joints Opening GRAVEL PACK Type WELL SCREEN Type ANNULUS SEA Type PROTECTIVE O Type WELL PAD Type	: 10/8/12) : 4.25-inch s) : HS Auger : Brian Thomas : Schedule 40 PVC : 1-inch : Threaded, flush ckup : 2.5-feet : Schedule 40 PVC : 1-inch : Threaded, flush : 0.010 inch : # 2 Sand SEAL : 3/8" Bentonite Pellets L : Grout
35-	1				Bottom of Boring				



